Sheet (5)

1. An Exchange with 12 channel handling 200 call trials per hour with 2 minutes expected duration. What is the probability that two calls are offered during 1 minute? If the lost traffic is offered to another switch with 6 channels, what is the probability that both switches are blocked simultaneously?

2. Consider a group of 3 channels that has the following probabilities: P(1)=0.2, P(2)=0.3. When a load of 3.84 Erlangs is offered, a blocking probability of 40% results. Evaluate:
    a. The probability that the network is empty.
    b. The average arrival call rate if the call duration is 120 sec.
    c. The lost traffic.
    d. The channel utilization.

3. During a busy hour 'A' Erlang is offered to a single channel Exchange that was occupied over a period of 49 minutes. When the lost traffic is overflowed to a multi-channel Exchange, it was blocked during 1.2 minutes.
Determine:
    a. The average number of busy channels,
    b. The probability of finding 2 channels free simultaneously.

4. A traffic load of 1.66 Erlang is offered to a network of 5 channels. If the call duration is 2 minutes,
    a. Determine the arrival call rate.
    b. What is the probability that only one channel is free.
    c. Determine the blocking probability.
    d. How often will the state of congestion occur during the busy hour?
    e. How long will it last on the average?

5. Consider a single channel delay system. In a busy hour, 18 calls are offered to the system, each of 2 minutes duration. Calculate:
    a. The probability that an arriving call is delayed.
    b. The average number of users that may exist in the system.
    c. The probability that there are more than 5 users in the system.
    d. The average system time.

6. Consider a full availability group of four trunks. The following probabilities of states are known: P (0) = 0.1, P(1) = 0.15, P(2) = 0.2, P(3) = 0.5. Evaluate:

    a. The blocking probability

    b. The carried traffic

    c. The offered traffic

    d. The overflow traffic

7. A group of 3 channels is tested 100 times. It is found that one channel is being busy 50 times and 2 channels 18 times. If the blocking probability is 2%, find:

    a. The probability that there are no calls in the system.

    b. The channel utilization.

    c. The average number of calls arrives during the call duration.

8. Consider a single channel packet network acts a delay system. In a busy hour, 1800 packets are offered, each of 1.2 sec service time. Calculate:

    a. The probability that packet is delayed.

    b. The average number of packets in the network.

    c. The average time spent in the network.

    d. The probability that there are more than 5 users in the system.

    e. The average number of waiting time of a packet.

    f. The probability that there are less than 6 packets in the network

9. A remotely located concentrator has 20 subscribers and a negligible small internal traffic. The call rate per user is 0.05 calls per minute with call duration of 2 minutes. Calculate the blocking probability if the concentrator has 4 trunks.

10. A traffic load of 1 Erlang is offered to a full availability group of 3 trunks. The average call duration is 2 minutes.

a. What is the probability that no calls are offered per hour?

b. What is the proportion of lost traffic?

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